

# PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION.

### Improvements in or relating to Dynamo-electric Machines.

We, THE BRITISH LIGHTING AND IGNITION COMPANY LIMITED, a British company, of B.L.I.C. Works, Cheston Road, Aston, in the County of Warwick, and JAMES COCHRANE HUTTON, Electrical Engineer, of "Canvey", Penn's Lane, Erdington, Birmingham, in the County of Warwick, a subject of the King of Great Britain, do hereby declare the nature of this invention to be as follows:—

The present invention relates to dynamo-electric machines and has more particularly for its object to cheapen and improve the stator construction in such machines.

According to this invention the stator is formed of a number of simple sections secured together to constitute a complete structure by such means as welding or bolting the sections together, or by fixing the sections within an external metal container by screws or wedges or by casting into the casing. The sections may be made advantageously from rolled steel bars, drop forgings, laminated plates built up, or castings.

In applying the invention to a field magnet of the salient pole type the yoke, two half pole cores and two half pole faces are formed in one piece without a joint, each section in the case of a two-pole magnet making one half, in a four-pole magnet one quarter, in a six-pole magnet one sixth of the complete field system and so on. In a convenient form of such a section the yoke is of arcuate shape and is connected at its ends by inwardly extending pole cores to two portions, also of arcuate shape but of smaller radius, on which the half pole faces are formed. Alternatively the pole cores themselves may be shaped to constitute the pole faces, being, if necessary, extended for this purpose. The joints between the sections are preferably arranged on the central lines of the pole faces, thus eliminating any airgap in

the magnetic path of the stator. The sections may be fixed inside a metal casing by wedges at the joints, or by screws holding the section in the casing or by casting the poles into the casing.

The exciting windings may be constituted by coils slipped on the half pole cores before the sections are fitted in the casing, or a single coil per pole may be used. By the former method economy in copper may be obtained owing to the shorter mean turn, and it would also be possible so to proportion the coils that compensation for armature distortion is obtained.

In another type of machine in which the pole cores project inwardly from the yoke and the pole faces are formed on them in a manner commonly adopted the sections are formed with half pole cores which are butted together to form a complete field system. The sections may be welded together along their line of junction or may be mounted within a casing as already described. Semi-circular grooves may be left in the abutting faces of the pole cores in order to form holes when the sections are joined for the passage of bolts to hold the end covers of the machine.

The joints of the pole sections need not be in contact and sufficient space may be left to enable the coils to be slipped on the half pole cores after the sections are assembled.

Dynamo-electric machines according to this invention would be very light owing to the dimensions of the magnetic circuit being reduced to a minimum, and the weight of copper would be reduced owing to a shorter mean turn being possible when the coils are wound on half cores.

Dated this 25th day of July, 1925.

HASELTINE, LAKE & Co.,

28, Southampton Buildings, London  
England, and

15, Park Row, New York, N.Y., U.S.A.,  
Agents for the Applicants,

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## COMPLETE SPECIFICATION.

## Improvements in or relating to Dynamo-electric Machines.

We, THE BRITISH LIGHTING AND IGNITION COMPANY LIMITED, a British company, of B.L.I.C. Works, Cheston Road, Aston, in the County of Warwick, and JAMES COCHRANE HUTTON, Electrical Engineer, of "Canvey", Penn's Lane, Erdington, Birmingham, in the County of Warwick, a subject of the King of Great Britain, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to dynamo-electric machines and has more particularly for its object to cheapen and improve the stator construction in such machines.

According to this invention the stator is formed of a number of simple similar sections, each consisting of two half poles and a yoke portion, secured together to constitute a complete magnetic structure by welding the sections together or by fixing them within an external metal container by casting. The sections are made from rolled steel bars, drop forgings, or castings. In applying the invention to a field magnet of the salient pole type the yoke, two half pole cores and two half pole shoes (if the latter be provided) are formed in one piece without a joint, each section in the case of a two-pole magnet making one half, in a four-pole magnet one quarter, in a six-pole magnet one sixth of the complete field system and so on.

In order that the invention may be clearly understood and readily carried into effect it will now be described more fully with reference to the accompanying drawing in which:—

Figure 1 shows in cross section one form of stator structure in accordance with this invention, and

Figures 2 and 3 are respectively a cross section and an elevation partly in section of a modification.

Referring to Figure 1, which represents a four-pole stator structure, each section extends over a quarter of the entire circumference and comprises a yoke 1 of arcuate shape formed at each end with a half pole core 2 so shaped as to make contact with the half pole cores of adjacent sections to which they are welded, the junction being prefer-

ably, as indicated, on the centre line of each complete pole. Semi-circular grooves 3 may be formed in the surfaces to be joined so as, after welding, to constitute passages through which bolts for securing the end covers of the machine may be passed. The exciting coils 4 are placed over the completed pole cores after assembly and are retained in position in any suitable manner.

In the form of the invention depicted in Figures 2 and 3 each half pole core 2 is extended to form a half pole shoe 5, separate exciting coils 4 being placed around each half pole core, thus securing economy in copper owing to reduction in the length of the mean turn. The sections, which, in the structure illustrated, are suitable for a two-pole machine, are located in their correct relative positions and an aluminium or other non-magnetic casing 6 is then cast around them, grooves 7 being preferably provided in order to form a key for the cast metal. As indicated, a space is left between the half pole shoes 5 in order to permit of the insertion of the exciting coils 4 in position after the casing has been cast around the magnetic sections.

Dynamo-electric machines according to this invention would be very light owing to the dimensions of the magnetic circuit being reduced to a minimum, and the weight of copper would be reduced owing to a shorter mean turn being possible when the coils are wound on half cores.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A dynamo-electric machine in which the stator is built up of a number of simple similar sections, of drawn metal or constituted by forgings or castings and each consisting of two half poles and a yoke portion, secured together to form a complete magnetic structure by welding the sections together or by fixing them within an external metal casing by casting.

2. A dynamo-electric machine as in Claim 1. in which the divisions between the sections occur within the poles.

3. A dynamo-electric machine as in

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Claim 1 or 2, in which adjacent sections abut on each other and are welded together at the junction.

4. A dynamo-electric machine as in  
5 Claim 1 or 2, in which each section is constituted by a yoke portion, two half pole cores and two half pole shoes.

5. A dynamo-electric machine as in  
10 Claim 4, in which each section is constituted by a yoke portion and two half pole cores each of which is extended to form a half pole shoe.

6. A dynamo-electric machine as in  
15 Claim 4 or 5, in which each half pole core is fitted with an exciting coil.

7. A dynamo-electric machine as in Claim 6, in which in each pole a space is left between the half pole shoes for the

purpose of fitting the exciting coils in position.

8. A process for making a stator structure for a dynamo-machine as in Claim 1 or 2, according to which the sections are fixed in their correct relative positions and an aluminium or other casing  
25 is then cast around them.

9. Stator structures for dynamo-electric machines substantially as hereinbefore described with reference to any of the figures of the accompanying drawing.  
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Dated this 26th day of April, 1926.

HASELTINE, LAKE & Co.,

28, Southampton Buildings, London,  
England, and

15, Park Row, New York, N.Y., U.S.A.,  
35 Agents for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

